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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/568,602	03/13/2006	David Philip Knight	4280-111	9173

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INTELLECTUAL PROPERTY / TECHNOLOGY LAW  
PO BOX 14329  
RESEARCH TRIANGLE PARK, NC 27709

EXAMINER
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HA, JULIE

ART UNIT	PAPER NUMBER
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1654

MAIL DATE	DELIVERY MODE
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01/22/2008

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	Application No. 10/568,602	Applicant(s) KNIGHT, DAVID PHILIP	
	Examiner Julie Ha	Art Unit 1654	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 1 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-39 is/are pending in the application.  
     4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☐ Claim(s) \_\_\_\_ is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☒ Claim(s) 1-39 are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
     a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |  |
|---|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                               | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                      | 5) <input type="checkbox"/> Notice of Informal Patent Application                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date ____ | 6) <input type="checkbox"/> Other: ____  |

## DETAILED ACTION

### *Election/Restrictions*

1. Restriction is required under 35 U.S.C. 121 and 372.

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1.

In accordance with 37 CFR 1.499, applicant is required, in reply to this action, to elect a single invention to which the claims must be restricted.

Group 1, claim(s) 1-19, drawn to a method for the selectively assembly of proteins into a structure comprising a) -GYG- partial protein sequence and b) addition of metal ions.

Group 2, claim(s) 20, drawn to a macromolecular molecule.

Group 3, claim(s) 21-39, drawn to a combination of a protein solution of a protein having at least a -GYG- partial protein sequence and an apparatus for forming a selective assembly from the protein solution.

It is noted that claims 14-19 recite the language "use of first protein sequence -GYG- as part of a loop structure." "Use" claim language is improper under U.S. practice. Thus, for the purposes of this restriction, "use of first protein sequence -GYG- as part of a loop structure" has been interpreted as a "method of use." Accordingly, claims 14-19 have been grouped as a method claim of Group 1.

2. The inventions listed as Groups 1-3 do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: The special technical feature of Group 2 is a protein having a partial protein sequence -GYG-. Fahnestock SR (WO 94/29450, publication date December 22, 1994) teaches a spider silk protein analogs derived from the amino acid consensus sequence of repeating units found in the natural spider dragline of *Nephila clavipes* (see abstract). The US Patent equivalence of the WO document (Patent # 6268169, published July 31, 2001) also teaches a protein having a sequence -GYG- and further comprising the sequence -GGYGP- (see SEQ ID NO:61) that would correspond to a macromolecule having a second partial protein sequence -GGYGG- (claims 10) and the second partial sequence is substituted with another amino acid (claim 11). The protein sequence has

the repeating –GYG– partial sequence. Therefore, there is no unifying inventive concept, since the macromolecule having –GYG– is known.

### ***Election of Species***

3. This application contains claims directed to more than one species of the generic invention. These species are deemed to lack unity of invention because they are not so linked as to form a single general inventive concept under PCT Rule 13.1.

The species are as follows:

Different partial protein sequence comprising –GYG–;

Different metal ions (genus); alkali metal, alkaline metal, transition metal, heavy metals, actinides and their species;

Different actinides: metals from periodic table, atomic numbers 89-103; for example, actinium, uranium, neptunium, plutonium, einsteinium;

Different fibrous protein (genus): fibroin, spidroin, or fibronectin;

Different semipermeable or porous material;

Different hollow-fibre membranes: polysulfones, polyethyleneoxide-polysulfone blends, silicone or polyacrylonitrile.

4. Applicant is required, in reply to this action, to elect a single species to which the claims shall be restricted if no generic claim is finally held to be allowable. The reply must also identify the claims readable on the elected species, including any claims

subsequently added. An argument that a claim is allowable or that all claims are generic is considered non-responsive unless accompanied by an election.

5. If Group I, II or III is elected, Applicant is required to elect a single disclosed species of partial protein sequence comprising –GYG- (sequence since the second partial sequence protein sequence is substituted with another amino acid), metal ions, and different fibrous protein. If Group III is elected, Applicant is further required to elect a single disclosed species of semipermeable or porous material, and different hollow-fibre membranes (if these two are the same thing, then elect a single disclosed species of hollow-fibre membrane). For example, Applicant elects Group I, and elects the first partial protein sequence –GGYGG-, and the metal ion copper, and the fibrous protein is fibroin (these read on claims 1, 7, 8-10, 12-14, 17 and 19).

6. Upon the allowance of a generic claim, applicant will be entitled to consideration of claims to additional species which are written in dependent form or otherwise include all the limitations of an allowed generic claim as provided by 37 CFR 1.141. If claims are added after the election, applicant must indicate which are readable upon the elected species. MPEP § 809.02(a).

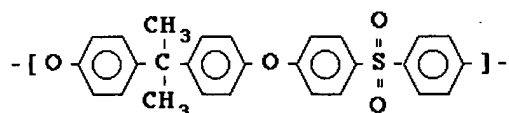
7. The claims are deemed to correspond to the species listed above in the following manner:

Claims 1, 3, 5, 7, 8, 15, 20-32 and 35-38.

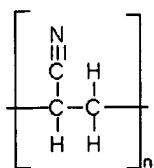
The following claim(s) are generic: Claims 2, 4, 6, 12, 16-18, 33-34 and 39.

8. The species listed above do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, the species lack the same or corresponding special technical features for the following reasons: Different partial protein sequence comprising –GYG- sequence are patentably independent and distinct

due to different amino acid content at the N- and C-termini. For example, a peptide sequence having RGDFKYFFGYGSCCWPFA is patentably independent and distinct from a peptide sequence having KPHFAGYGSRPENRGG. Further, search for one would not lead to the other, requiring independent searches. Different metal ions (genus) are patentably independent and distinct due to different physiological characteristics. For example alkali metals are patentably independent and distinct from heavy metal or transition metals. For example, sodium metal is structurally different from zinc ions and they have different characteristics: sodium has a boiling point of 1156K (883°C) and zinc has boiling point of 1180K (907°C). Different metal ions are patentably independent and distinct due to different physiological characteristics. For example, zinc ion is different than copper ion, which is different than silver ion, nickel, etc. They all have different density, boiling point and melting point for example. The boiling point for zinc is 1180K (907°C), copper is 2835K (2567°C), silver is 2435K (2162°C), nickel is 3186K (2913°C), etc. Different actinides are patentably independent and distinct because of different characteristics. For example, actinium has the boiling point of 3471K (3198°C), uranium has the boiling point of 4404K (4131°C), and thorium has the boiling point of 5061K (4788°C). Further, search for one would not necessarily lead to the other. Different fibrous proteins fibroin, spidroin, or fibronectin are patentably independent and distinct due to different amino acid content. For example, fibroin (GenBank Accession # AAK83145) is a 2655 amino acid residue protein; spidroin (GenBank Accession #AAC38957) is a 544 amino acid residue protein; fibronectin (GenBank Accession #AAA49707) is a 2481 amino acid residue protein. Further, search for one would not necessarily lead to the other, requiring independent searches. Semipermeable or porous materials are patentably independent and distinct because of their different structures. For example, phospholipids bilayer is a semipermeable membrane, while porous materials can be made of metals or ceramics. Further, search for one would not necessarily lead to the other. Different hollow-fibre membranes are patentably independent and distinct due to their different structures. For example, polysulfone has the molecular formula C<sub>27</sub>H<sub>22</sub>O<sub>4</sub>S and has the structure



; polyacrylonitrile has the structure



. Further, search for one would not necessarily lead to the other, requiring independent searches.

9. Applicant is advised that the reply to this requirement to be complete must include (i) an election of a species or invention to be examined even though the requirement be traversed (37 CFR 1.143) and (ii) identification of the claims encompassing the elected invention.

10. The election of an invention or species may be made with or without traverse. To reserve a right to petition, the election must be made with traverse. If the reply does not distinctly and specifically point out supposed errors in the restriction requirement, the election shall be treated as an election without traverse.

11. **Should applicant traverse on the ground that the inventions or species are not patentably distinct, applicant should submit evidence or identify such evidence now of record showing the inventions or species to be obvious variants or clearly admit on the record that this is the case. In either instance, if the examiner finds one of the inventions unpatentable over the prior art, the evidence or admission may be used in a rejection under 35 U.S.C.103(a) of the other invention.**

### ***Conclusion***


12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Julie Ha whose telephone number is 571-272-5982. The examiner can normally be reached on Mon-Fri, 8:00 am to 4:30 pm.

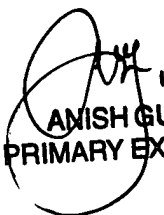
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13. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cecilia Tsang can be reached on 571-272-0562. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

14. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

  
Julie Ha  
Patent Examiner  
AU 1654

  
ANISH GUPTA  
PRIMARY EXAMINER